



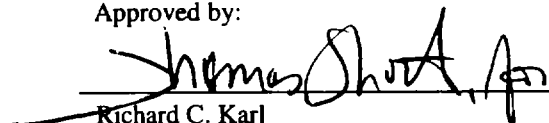
## **Five-Year Review Report**

### **Third Five-Year Review Report For Rose Township Dump Site Holly, Oakland County, Michigan**

**June 2007**

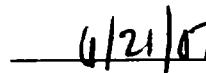
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## **List of Acronyms**

ARAR	Applicable or Relevant and Appropriate Requirements
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
U.S. EPA	Environmental Protection Agency
ESD	Explanation of Significant Difference
IC	Institutional Control
MCL	Maximum Contaminant Levels
MDNR	Michigan Department of Natural Quality
MDEQ	Michigan Department of Environmental Quality
mg/kg	Milligram Per Kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OCHD	Oakland County Health Department
PCBs	Polychlorinated Biphenyls
PCE	Perchloroethylene
ppb	Parts Per Billion
ppm	Parts Per Million
PRP	Potentially Responsible Party
RD/RA	Remedial Design/ Remedial Action
RI/FS	Remedial Investigation/ Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVE	Soil Vapor Extraction
TCE	Trichloroethylene
VOC	Volatile Organic Compound

## Executive Summary

The remedy for the Rose Township Dump Site (the site) in Holly, Michigan included 4 major components: 1) excavation and incineration of PCB contaminated soils; 2) excavation, treatment, on-site consolidation, and capping of lead-and arsenic impacted soils; 3) soil vapor extraction (SVE) for soils contaminated with volatile organic compounds (VOCs), and 4) groundwater extraction and treatment for VOCs. The site achieved construction completion with the signing of the Preliminary Closeout Report on February 5, 1996. The trigger for this Five-Year Review was the signing of the last Five-Year Report on June 28, 2002.

A protectiveness determination of the remedy at the Rose Township Superfund site cannot be made at this time until further information is obtained. Further information will be obtained by completing the capture zone evaluation for recently increased extraction pumping rates at the eastern-most edge of the VOC plume. Additional analytical data is needed to provide conclusive evidence that the entire VOC plume is being captured at the new extraction rates. Also additional monitoring wells might be installed to better evaluate hydraulic capture of the VOC plume and to determine if another extraction well is necessary to achieve complete plume capture. Additional hot spots sampling and treatment are being considered to eliminate the source for groundwater contamination. Continued monitoring downgradient wells GW-18 and GW-17I/D must occur, while evaluating vinyl chloride concentration trends in wells situated at the property boundary (GW-19S and GW-20D). It is expected that these actions will take 12 months to complete, at which time a long-term protectiveness determination will be made.

Vinyl chloride has been detected at two residential wells since they were first sampled by Oakland County Health Department (OCHD) in June 2003. In February 2005, the vinyl chloride concentration increased to 2.3 ug/l, and increased to 4.8 ug/l in February 2007, which exceeded the Part 201 Drinking Water Criteria of 2.0 ug/l for vinyl chloride. In April 2005, a groundwater treatment system was installed in the basement of the one resident. This treatment system has been successful at treating the vinyl chloride concentration to non-detectable levels. The treatment system is protective and effective for the short-term. Other permanent solutions, such as the installation of a deeper well are being considered.

Five-Year Review Summary Form

Site Identification		
Site Name (From WasteLAN): Rose Township Dump Site		
EPA ID (From WasteLAN): MID980499842		
Region: Five	State: MI	City/County: Rose Township, Oakland County
Site Status		
NPL status: <input checked="" type="checkbox"/> X Final Deleted Other (specify): _____		
Remediation Status (choose all that apply): Under Construction <input checked="" type="checkbox"/> X Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? Yes <input checked="" type="checkbox"/> X No	Construction Complete date: <u>02/05/1996</u>	
Has the site been put into reuse? <input checked="" type="checkbox"/> Yes X No		
Review Status		
Lead Agency: United States Environmental Protection Agency		
Author Name: Nabil Fayoumi		
Author Title: Remedial Project Manager	Author Affiliation: US EPA Region 5	
Review Period (Start and end dates in WasteLAN): <u>01/01/2007</u> to <u>06/30/2007</u>		
Date(s) of Inspection: <u>03/22/07</u>		
Type of Review: <input checked="" type="checkbox"/> X Post-SARA Pre-SARA NPL-Removal only Non-NPL Remedial Action Site G NPL State/Tribe-lead Regional Discretion)		
Review Number: 3 (Third)		
Triggering Action: Previous Five-Year Review		
Triggering Action Date: <u>6/28/2002</u>		
Due Date: <u>6/28/2007</u>		

## Five-Year Review Summary Form, Continued

### Issues:

#### 1. Groundwater:

- a. Groundwater chemical and hydraulic data suggests that the plume capture zone may need enhancement.
- b. Some additional soil contamination has been identified.
- c. Vinyl chloride continues to affect two existing residential drinking water well.
- d. During the site inspection, trees had fallen and fencing damage was evident. Trees frequently fall naturally and damage the fence.

#### 2. Institutional Controls and Site Access:

- a. The recommended ICs in the last five year review have not been implemented. Also, the need for additional ICs needs to be explored. Implementing and maintaining effective ICs will be required to assure protectiveness of the remedy.
- b. Long-term stewardship must be assured which includes maintaining and monitoring effective ICs.

### Recommendations and Follow-up Actions:

#### 1. Groundwater:

- a. Additional hydraulic sampling and analysis over the course of 12 months will hopefully provide the necessary data to verify the extent of plume capture and to ascertain the best location for the placement of an additional extraction well.
- b. Excavation and/or treatment of soil contamination hot spots will eliminate some the continuing sources of contaminants to the groundwater.
- c. As a temporary measure, continue to provide treatment to the residential well with vinyl chloride above U.S. EPA's action level, increase sampling frequency, and add dissolved methane to the residential wells quarterly sampling. A permanent solution, such as the installation of a deeper residential well, should be evaluated and implemented within the next 12 months.
- d. PRPs will repair the damaged fence and remove the fallen trees.

#### 2. Institutional Controls:

- a. U.S. EPA and PRPs will prepare an IC Plan to conduct additional IC evaluation activities including title work, re-evaluating the need for additional ICs, and planning for the implementation of ICs.

- b. The PRPs will develop a plan to oversee and monitor ICs to ensure long term stewardship. The Plan will require annual analysis, reporting, and certification of conformance to the ICs and their effectiveness.

**Protectiveness Statement(s):**

A protectiveness determination of the remedy at the Rose Township Superfund site cannot be made at this time until further information is obtained. Further information will be obtained by completing the capture zone evaluation for recently increased extraction pumping rates past the eastern-most edge of the site plume. Additional analytical data are needed to provide conclusive evidence that the entire site plume is being captured at the new extraction rates. Also, additional monitoring wells might be installed to better evaluate hydraulic capture of the site plume and to determine if another extraction well is necessary to achieve complete plume capture. Additional hot spot sampling and treatment are being considered to eliminate sources for groundwater contamination. Continued monitoring of downgradient wells GW-18 and GW-17I/D will occur, while evaluating vinyl chloride concentration trends in wells situated at the property boundary (GW-19S and GW-20D). It is expected that these actions will take 12 months to complete, at which time a long-term protectiveness determination will be made.

Rose Township Dump Site  
Rose Township  
Oakland County, Michigan  
Second Five-Year Review

## **I. Introduction**

The purpose of Five-Year Reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The Agency is preparing this Five-Year Review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the National Contingency Plan; 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (U.S. EPA) Region 5 has conducted a Five-Year Review of the remedial actions implemented at the site located in Oakland County, Michigan. This review was conducted by the Remedial Project Manager (RPM) for the entire site from January 2007 through June 2007. This report documents the results of the review.

This is the third Five-Year Review for the site. The triggering action for this statutory review is the signing of the second Five-Year Review report on June 28, 2002. This review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

## II. Site Chronology

**Table 1 – Chronology of Site Events**

Event	Date
Initial discovery of problem or contamination	12/01/1979
State of Michigan Removal Action	1979-1980
NPL listing	09/08/1983
U.S. EPA Removal Actions	05/31/1986
Fund-lead Remedial Investigation/Feasibility Study complete	06/22/1987
ROD signature	09/30/1987
ROD Amendment #1 (allows test of Soil Flushing)	01/18/1989
Consent Decree for RD/RA	07/18/1989
Remedial design start	07/18/1989
Interim groundwater measure begins operation	03/1992
On-site incinerator construction complete/incineration of PCB soils begins	09/02/1992
Incineration complete	10/13/1993
ROD Amendment #2 (replace incineration of VOC contaminated soils with SVE)	08/25/1995
Remedial design complete	10/31/1995
Final inspection of SVE system	11/30/1995
Final inspection of pump and treatment system	02/03/1996
Construction completion date	02/03/1996
First Five-Year Review	07/18/1997
Monitoring wells MW-17 and MW-18 installed	01/2002
Revised Groundwater Monitoring Plan Submitted	03/2002
MW-17 and MW-18 sampled and confirmed contamination beyond PW-6	04/2002
Second Five-Year Review	June/28/2002
Installed on-site monitoring wells GW-19S, GW-19D, GW-20S, GW-20I, and GW-20D	January 2004
Installed off-site monitoring wells GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, and GW-24D	August 2004
Installed on-site monitoring wells GW-21S, and GW-21D	September 2004
Conducted off-site geochemical groundwater evaluation, key wells were frozen and inaccessible	January 2005
Conducted hydrologic study	November 2005
Installed off-site monitoring wells GW-25S, GW-25D, GW-26S, GW-26D and conducted supplemental hydrologic study	March 2006
Optimized the Pump and Treatment System	October 2006
Draft Institutional Control Investigation Study	March 2007
Capture Zone Analysis Memorandum	March 2007

## **II. Background**

### **Physical Characteristics**

The site is located in Rose Township, Oakland County, Michigan, approximately 40 miles northwest of Detroit. The site is comprised of approximately 100 acres of undeveloped, rural property. The site is located approximately one mile west of the town of Rose Center. The site comprises an upland area which is almost completely surrounded by wetlands. The southern periphery is heavily wooded with hardwoods. The middle portion of the site, a rolling meadow, is bordered by a marsh to the west and the northeast, and Demode Road to the North. Adjacent to the site, a sparse population is located next to several small lakes, however, development continues to occur in these areas. The population of Rose Township is about 4,600 people. Residences are located in every direction from the site in this rural area.

### **Land and Resource Use**

Examinations of aerial photographs show that a portion of the site was farmed through the late 1950's. In the 1960's, farming was abandoned and illegal waste disposal began. The current land use of the surrounding area is residential, agricultural, and recreational. The site is currently zoned as agricultural use. However, as stated above, residential development continues in the area. In establishing cleanup requirements for the site, U.S. EPA considered the theoretical possibility of residential development of the site. Soils are to be treated to the ROD specified cleanup levels that are below EP toxicity and will be considered non-hazardous. The site itself is currently fenced enclosing all soils that have undergone on-site treatment.

The groundwater aquifer underlying the site is approximately 40-120 feet thick and is currently used by downgradient residential homes as a drinking water source. The dominant groundwater flow direction is to the north and northeast near the end of the plume. The nearest downgradient residential well is about 1600 feet away from the site. However, new private wells have been installed in the area, but have been screened in the non-impacted aquifer.

### **History of Contamination**

In the mid-1960's farming of the site ceased and illegal waste disposal began. The operators placed an estimated 5,000 drums of waste on and into 12 acres of the southwest part of the site. The waste consisted of spent solvents, paints, and polychlorinated biphenyls (PCBs). Another portion of the site was contaminated by lead battery sludges. Surface soils located along the southwestern edge of the site were contaminated with PCBs, lead, and VOCs. PCBs in soil were present at concentrations of up to 980 mg/kg.

In the north, the groundwater plume consists primarily of vinyl chloride. In the southwest, the plume consists of vinyl chloride, along with xylene, toluene, benzene (BTEX), chlorinated solvents, and several other chemicals of concern. The plume has traveled north at least 2000 feet from the primary disposal area along the southwestern edge of the site. Site plume has migrated to two residences.

## Initial Response

In 1968, the Oakland County Health Department (OCHD) was notified of the illegal dumping at the site. A subsequent court action ordered a site cleanup by the waste hauler. In 1969, an adjacent landowner sued the waste hauler and the site landowner, demanding that the site be cleaned up. No apparent cleanup occurred at either time.

In 1971, Rose Township also brought suit against the waste hauler and property owner to force dumping to cease and to initiate a cleanup. Dumping finally ceased and some unspecified cleanup action was reportedly taken.

The Michigan Department of Environmental Quality (MDEQ), then known as the Michigan Department of Natural Resources (MDNR), was notified of the existence of the site by OCHD in April 1979. The MDEQ surveyed the area and identified approximately 1,500 drums. Although some of the drums were partially buried, most had been left on the surface. A majority of the drums were either leaking or were bulging, due to the expansion of the contents. The drums were subsequently sampled in June 1979 by MDEQ.

At the same time as the drum sampling, samples from domestic wells in the area showed low levels of trichloroethylene (TCE) and perchloroethylene (PCE). MDEQ supplied the homes with bottled water until mid-1980 when a second round of sampling showed no contamination in the wells.

Based upon the results of the 1979 drum sampling, the Michigan Toxic Substance Control Commission declared a Toxic Substance Emergency. Funds were appropriated by the State for an immediate removal action and for a study of the nature and extent of contamination. By July of 1980, when the removal action was complete, over 5,000 drums had been removed from the site.

In the spring of 1980, MDEQ began a hydrogeologic study. The study, which was completed in 1981, found organic contamination below the shallowest aquifer. MDEQ performed additional investigations in 1982, but was unable to determine groundwater flow patterns or the distribution of contamination, due to the extreme complexity exhibited in the subsurface geology at this site.

In September 1983, the site was placed on the National Priorities List. The Remedial Investigation/Feasibility Study (RI/FS) subsequently began in on September 30, 1984. The final RI report was released in August 1987. U.S. EPA released the FS and issued a Proposed Plan for remedial action in August 1987.

## Basis for Taking Action

Hazardous substances that have been released at the site in each media include:

<b>Soil:</b>	Lead	PCBs	VOCs	
<b>Groundwater:</b>	Vinyl Chloride 1,2-DCE	Xylene TCE	Toluene PCE	Benzene

Exposure to contaminated soil and groundwater are associated with significant human health risks, due to exceedances of U.S. EPA's risk management criteria for either the average or the reasonable maximum exposure scenarios. The risk was highest for exposures to groundwater due to the high

concentrations of carcinogenic TCE and PCE that exceed State and Federal Maximum Contaminant Levels (MCLs) for drinking water. Risks from exposure to soils were significant due to the presence of carcinogenic TCE, PCE, and other noncarcinogenic hazards including high concentrations of lead.

### **III. Remedial Actions**

#### **Remedy Selection**

On September 29, 1987, U.S. EPA issued a Record of Decision (ROD) that called for the following actions:

- Excavation and on-site incineration of PCBs and metals contaminated surface soils, and VOCs contaminated subsurface soils. Incineration ash was reburied on-site. Toxicity was below EP levels;
- Installation of a groundwater extraction and treatment system to capture and draw back the groundwater contamination; and,
- Implementation of a groundwater monitoring program to ensure the adequacy of the cleanup.
- The selected remedy would use permanent systems to eliminate the principal threat posed to human health and the environment by destroying the PCBs in the surface soils and the source of further groundwater contamination in the subsurface soils. The selected remedy would also eliminate a principal threat by extracting and treating the groundwater contaminated plume.
- The ROD established groundwater cleanup standards based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs), risk-based levels, and State of Michigan criteria for protection of groundwater quality.

Shortly before issuing the ROD, U.S. EPA began to conduct cleanup discussions with numerous potentially responsible parties (PRPs). As U.S. EPA was reaching a cleanup agreement with the PRPs, the Agency issued ROD Amendment #1 in January 1989. ROD Amendment #1 determined that soil flushing could be tested as an alternative method to remove VOCs from the subsurface soils. If soil flushing was determined to be a viable cleanup method, it could then replace incineration as the remedy for the subsurface soils. ROD Amendment #1 did not alter the cleanup method for either PCB-contaminated soils, or groundwater plume, nor did it alter the cleanup standards for contaminants.

#### **Remedy Implementation**

In late 1988, U.S. EPA completed consent decree (CD) negotiations with 12 settling defendants for the implementation of the ROD and ROD Amendment #1. The State objected to the ROD Amendment #1 and the terms of the CD on technical grounds. The objections resulted in the lodging of the CD being delayed until March 1989. The pre-design and design work began in July 1989. The CD was entered by the Court on July 18, 1989. The design work did not start until late 1990.

The remedial design and subsequent construction of the on-site incinerator for PCB-incineration phase was completed in September 1992. During this time, U.S. EPA had reviewed the soil flushing laboratory results submitted by the PRPs in 1992. U.S. EPA determined that soil flushing was not a viable method for cleanup of subsurface VOCs, and in accordance with the CD, directed the PRPs to perform a focused feasibility study to determine a viable cleanup method for the VOCs in the soils. In

the focused feasibility study, the PRPs examined the presumptive remedies for VOCs in soils (soil vapor extraction [SVE], low temperature thermal desorption, and on-site incineration), and recommended that SVE be pilot-tested to determine if it was a viable cleanup technology for use at this site.

In January 1994 and January 1995, two separate SVE pilot tests were performed by the PRPs. The results indicated that SVE was a viable technology for most of the impacted soils and that supplemental technologies may have to be implemented to complete a soil cleanup in certain areas of the site. In the summer of 1995, U.S. EPA released for public comment the focused FS and a proposed plan for ROD Amendment #2. The ROD Amendment was signed by U.S. EPA on August 25, 1995. It called for SVE to replace on-site incineration of VOC contaminated soils.

In early 1994, upon completion of the incineration, the PRPs began design work for the SVE and groundwater remedial actions. The designs were completed by the PRPs and approved by U.S. EPA in October 1995.

The PRPs began on-site incineration of the PCB-contaminated soils in September 1992. Approximately 34,000 dry tons of soils had been treated by the time the incineration phase was completed on October 13, 1993. In addition, nearly 5,000 cubic yards of lead-contaminated soils were excavated and tested for leachability of lead (EP Toxicity), and then buried on-site with the incinerator ash. The material was buried beneath a minimum of 5 feet of clean cover soil. Confirmatory samples were taken by U.S. EPA to assure the completeness of the work.

In the winter of 1992, as an interim measure, the PRPs began to install a small air stripper on-site to begin pumping and treating contaminated groundwater. The interim groundwater cleanup measure began operating in March 1992, treating groundwater at a rate of 40 gallons per minute. The interim measure was to delay the advance of the plume until the final groundwater extraction and treatment system was operational. The final treatment system could not be designed and constructed until the incinerator had been dismantled and removed from the site.

Upon completion of the incineration phase of the cleanup, the PRPs began design and installation of the SVE and final groundwater extraction and treatment systems. Approximately 57 shallow vacuum/air injection wells were installed in the surface soils to remove VOCs from the contaminated soils above the water table. Air withdrawn from the soils was treated by vapor phase activated carbon units to remove VOCs prior to discharge to the atmosphere.

A final construction inspection of the SVE system was conducted by U.S. EPA on November 30, 1995. The PRPs' contractor started operation of the SVE system during the final inspection and at the time, it was determined that the SVE system was constructed and was operating as designed. Soil cleanup levels were expected to be achieved in 12 to 14 months.

In the fall of 1997, the PRPs expanded the SVE system by installing 4 dewatering trenches containing 18 horizontal SVE Wells. Additionally, the PRPs constructed a soil stockpile in the northeast portion of the site containing six horizontal SVE wells. The stockpile (stockpile 1) contains approximately 950 cubic yards of soil generated during the dewatering trench construction.

During the installation of horizontal SVE/dewatering trench in the southwest portion of the site in October and November 1997, moderate levels of organic compounds were detected by the PRPs. In February 1998, the PRPs collected 32 samples in the area and the results showed that VOCs and PCBs were present above the site specific cleanup standards. However, additional samples were required to define the extent of this contamination. In July and August of 1998, additional soil samples were taken

by the PRPs to delineate the area of contamination. Based on the sampling results, it was estimated that approximately 3,150 cubic yards of soil in the area exceeded the VOC cleanup standard and 50 cubic yards exceeded the PCB standard.

In April 1999, the PRPs' work plan which addressed the remaining contamination was approved by U.S. EPA. The work plan required the excavation and off-site disposal of the PCB contaminated soils. It also required the excavation of the VOC contaminated soils as well as construction and operation of an on-site SVE stockpile treatment system to treat the VOC contaminated soils. If the volume was less than 3,000 cubic yards, the soil was to be treated in place via SVE. Because more than 3,000 cubic yards were impacted, the soils were excavated and treated ex situ. These soils are to meet clean-up standards as specified in the ROD.

Between April 4 and April 20, 1999, the PRPs performed the excavation, verification sampling, and off-site disposal of the PCB contaminated soils. Approximately 150 cubic yards of soil were disposed of off-site.

From April 20 to May 7, 1999, the PRPs performed the excavation, and verification sampling of the VOC contaminated soils. Based on the earlier sampling, the VOC impacted area was identified to depths of 11 to 12 feet below grade in some areas and 7 to 8 feet in others. Soils in the northern portion of the excavation area were removed to a depth of 8 feet. The remaining area was excavated to 12 feet below grade. Despite attempts to dewater the excavation, verification sampling was only possible on the portion of the sidewalls and floors above the water level because of groundwater infiltration into the deep portion of the excavation. At the request of MDEQ, to prevent possible migration of groundwater which could result in the re-contamination of the soils, 2 feet of clay was placed in the bottom of the excavation and compacted, and then the excavation was backfilled with clean soil from an on-site borrow source.

The excavated VOC contaminated soil (approximately 2,600 cubic yards) was transferred to a location near the center of the site and used to construct an SVE Stockpile System for subsequent treatment. Construction of the stockpile (Stockpile #2) began in April 12, 1999 with system start-up occurring on May 24, 1999. The stockpile has a base approximately 160 feet long by 150 feet wide and is 7 feet tall. A total of 10 horizontal SVE wells were installed in the stockpile. The system is monitored as part of the existing SVE system. These soils are to meet clean-up standards as specified in the ROD.

A total of 91 SVE wells were installed and operated at the site. The system was fully automated and designed to operate 24 hours per day. The extracted soil gas was passed through vapor phase granular activated carbon to remove contaminants prior to being discharged to the atmosphere from system start-up to August 12, 1996. A thermal oxidizer was installed on August 12, 1996 because of the high carbon consumption rate of the system. On March 13, 1997, the system was changed back to the vapor phase granular activated carbon because of resonance of the thermal oxidizer stack which could not be eliminated. On March 12, 2001, and as approved by the MDEQ and U.S. EPA, the carbon absorption controls were bypassed and the process air was discharged directly to the ambient air; i.e. the carbon absorption treatment step was no longer necessary to meet discharge limits.

For the groundwater extraction and treatment system, the PRPs installed a total of nine extraction wells within the groundwater plume. The system as a whole is designed to pump up to 400 gallons per minute. A treatment plant was constructed on-site, where the extracted groundwater is subjected to air stripping for removal of VOCs prior to discharge to the adjacent wetlands in accordance with substantive requirements of an NPDES discharge permit. The air stripper discharges vapor directly to the atmosphere, in accordance with the substantive requirements of a State air use permit. The ROD

estimated that the groundwater extraction and treatment system would need to operate between 10 and 30 years. A final inspection of the groundwater extraction and treatment system was conducted by the U.S. EPA on February 3, 1996. At that time it was determined that the groundwater extraction and treatment system was constructed as designed. The system began operation on February 5, 1996.

On February 5, 1996, with the signing of the Preliminary Close-Out Report, U.S. EPA determined that the site achieved construction completion status. U.S. EPA and the State have determined that all RA construction activities were performed according to specifications. After groundwater and soil cleanup levels have been met, U.S. EPA will issue a Final Close-Out Report. This will require that all areas of the site with contamination be verified as clean through soil and groundwater sampling. Any areas not meeting State residential cleanup criteria may need to have a deed restriction applied.

## **Institutional Controls**

### Decision Document:

Neither the ROD nor the ROD Amendments required ICs since it was anticipated that the remedy would achieve unlimited use and unlimited exposure (UU/UE). Nevertheless, since U.S. EPA anticipates that the cleanup standards identified in the ROD may not be achieved for some time, ICs may be required to ensure the protectiveness of the remedy. U.S. EPA will evaluate whether the IC requirements must be clarified or amended. The IC Investigation/Study in Appendix II identifies those areas that do not support unlimited use and unrestricted exposure (i.e., non-UU/UE). To date, no additional proprietary or governmental controls or informational tools have been developed or recorded with the local units of government. Permits are required from the Oakland County Health Department prior to installing any drinking water wells. The Oakland County Health Department, in consultation with MDEQ staff, advises residents that new wells in that area must be installed at 175 feet or deeper.

During the last Five Year Review (2002) it was recommended that a deed restriction be placed on the portion of the property where incineration ash and contaminated soils were consolidated and covered. The recommended IC was not implemented by the Settling Defendants. In March 2007, the PRPs completed an Institutional Control Investigation/Study. The property encompassing the site is almost entirely owned by the State of Michigan.

**Institutional Controls Summary Table**

Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions	IC Objective	Title of Institutional Control Instrument Implemented (note if planned)
Lead/arsenic Ash Pile Area- and other areas of soil not meeting residential cleanup standards identified in Appendix II, Institutional Control Investigation/Study	Prohibit residential use and public access; Prevent interference with cap	Restrictive Covenant (planned)
Groundwater – current area that exceeds groundwater cleanup standards	Prohibit groundwater use until cleanup standards are achieved	Under review
Residential property groundwater treatment system	Prohibit groundwater use unless treated until Clean up standards are achieved.	Under review

Maps, which depict the current conditions of the site, and areas which do not allow for UU/UE, are included in Appendix 1. The basic IC objective and performance standards are prohibiting interference with the soil cap, and prohibit residential use of the groundwater and public access to areas of the site until soil and groundwater cleanup standards are achieved.

The fence surrounding the site is an engineered control that restricts direct access to the property. Based upon observations done during the site inspection and interviews, there appear to be no current uses of the site which are inconsistent with IC objectives. The Site is zoned agricultural; however, no land use is occurring except operation of the treatment system and disposal area. The future end-use of the site has not been established; however, it may be used by the public, the most likely use is recreational (i.e. green space) with a potential use as residential. Either type of land use will require additional ICs.

In a letter dated December 19, 2006, U.S. EPA requested that the PRPs conduct an IC study for the Site. On March 9, 2007, the PRPs submitted a draft IC Investigation/study which provided information on some of the IC evaluation activities required by U.S. EPA. At this time, initial IC evaluation activities have determined that required ICs are needed and have not been implemented on all non UU/UE areas and additional IC evaluation activities are required. It is anticipated that the IC Plan, will include conducting additional IC evaluation activities such as a site survey, title work, and re-evaluating the need for additional ICs. The IC Plan will be prepared by U.S. EPA (with input from the PRPs) by December 2007. Long-term stewardship requires that effective ICs are implemented, monitored and maintained. As discussed below, a plan will be prepared which provides for long-term Site stewardship.

## **System Operation/Operation and Maintenance**

### **Groundwater Extraction/Treatment**

Operation and maintenance of the Groundwater Extraction and Treatment System is performed in accordance with the April 12, 1996, Groundwater Extraction and Treatment System Operation and Maintenance Manual. Pursuant to that manual, monitoring of both the influent and effluent to the treatment system are monitored on a weekly and quarterly basis. Inspection of the physical plant is also carried out during those monitoring events.

Groundwater monitoring has been performed pursuant to the December 1995, Groundwater Monitoring Plan to determine whether or not hydraulic capture of the plume is occurring and whether chemical levels in the groundwater are decreasing. However, it wasn't until additional monitoring wells were installed after 2002 that a proper evaluation could be made that determined that complete plume capture was not occurring. Analysis being performed includes the chemicals of concerns listed in the ROD and CD and those parameters required under the NPDES discharge requirements issued by the MDEQ, plus 1,2-DCE. U.S. EPA, in consultation with the MDEQ, will certify completion of the groundwater remediation once it has been demonstrated that cleanup levels have been attained and maintained for all chemicals of concern listed in the ROD and CD.

Since Fall 1997, the monitoring network of wells has been sampled annually to monitor the effectiveness of the groundwater extraction system. The network has included monitoring wells and extraction wells within the plume, and wells considered to be at the perimeter of the plume. In March of 2002, U.S. EPA approved a revised Groundwater Monitoring Plan, submitted by the PRPs. The purpose for the revision was to take into account the most current information concerning the groundwater plume and aquifer to more effectively monitor the groundwater extraction system.

As part of the revised monitoring program, and in response to concerns that the groundwater monitoring network was not adequate to determine if the entire plume was being captured, the PRPs installed three monitoring wells (GW17I, GW-17D, GW-18) at the toe of the plume downgradient of extraction well PW-6. This work was performed in January 2002. The installation of those wells included vertical profiling of two of the boring down to the base of the aquifer. Those results were then used to determine at what depth to install the well screens for the permanent wells. Groundwater samples results from the vertically profiled borings indicated that vinyl chloride concentrations at the base of the aquifer exceeded cleanup standards. The well screen at GW17D was placed in the most contaminated section of the aquifer where results showed 60 ppb for vinyl chloride. The results from the permanent well confirmed that the groundwater extraction system was not effectively capturing the entire plume and modification to the extraction system and/or monitoring network was necessary to ensure complete capture of the plume. Limited residential well monitoring data, at that time, showed that none of the wells sampled downgradient from the site was exposed to site related contamination. However, it was determined that more work was necessary to ensure no one is being exposed to site related contaminants. In 2005 and 2007, vinyl chloride was detected at two residential wells. One residential well exhibited elevated vinyl chloride concentration that exceeded the Part 201 Drinking Water Criteria of 2.0 ug/l for vinyl chloride.

The extraction well network was reconfigured in March 2004. Extraction well PW-9 was replaced with PW-3, and PW-5 was replaced with PW-1. The former active extraction wells were PW-4, PW-5, PW-6, PW-7, and PW-9. The current active extraction wells are PW-1, PW-3, PW-4, PW-6, PW-7, and PW-8.

Steps are being taken to optimize the pumping capacity of the groundwater extraction system. In 2006, the three extraction wells were fitted with new larger pumps in an effort to increase pumping rates and attempt to achieve complete hydraulic capture. Since the new pumps were installed, the groundwater treatment system is operating at its full capacity (approximately 400 gallons per minute). A capture zone analysis was completed in March 2007. A copy of the capture zone analysis is included in Appendix II. The capture zone analysis indicates that the plume capture has been enhanced due to the increases of the extraction rates at extraction wells PW-1, PW-4, and PW-6. The calculated capture zone areas are larger compared to the capture zone calculated using the pre-modification extraction rates. Water levels are lower in key observation wells in the northern part of the plume and several observation wells have been shown to be within the area of pumping influences from PW-1, PW-4, and PW-6, suggesting possible overlapping areas of capture.

However, the analytical data does not provide conclusive evidence that the entire VOC plume is being captured at the new extraction rates, and there is uncertainty from the capture zone analysis as to whether the eastern-most edge of the plume is being intercepted by PW-6. The status of the site complete plume capture is still uncertain at this time. Additional data is required to conclusively confirm complete hydraulic capture of the VOC plume. To date, the groundwater extraction system has treated over 441 pounds of VOCs.

As mentioned above, long-term stewardship requires that effective ICs are implemented, monitored and maintained to ensure that the contaminated shallow groundwater is not used for drinking water purposes until cleanup standards are achieved. Therefore, a plan will be developed to develop, implement, and monitor ICs to ensure long term stewardship including the requirement of regular reporting of conformance to the ICs and their effectiveness.

## **Soil Vapor Extraction**

The SVE system was operated and maintained in accordance with the October 1996, Soil Vapor Extraction System Operation and Maintenance Manual. Performance of the SVE system was evaluated through off-gas sampling and air flow monitoring conducted during routine system maintenance checks. Monthly discharge samples were collected and analyzed as part of routine monthly operation and maintenance. Site visits were performed by the PRP's contractor personnel once a month. During the visits, operation of the SVE system was checked and adjustments were made to maximize efficiency. In addition to the actions described above, a fence was installed at the site to fully encompass the contaminated area and the treatment system.

A four-week SVE spike test was implemented in October 2005. At that time, the SVE system had removed and treated over 6,800 pounds of VOCs, before achieving asymptotic levels for several years. Yielding since December 2001 had diminished to insignificant levels (approximately 0 to 0.08 lbs/day), indicating that the SVE system had reached a point where it was no longer effective to operate. The spike test demonstrated that the SVE had effectively removed the VOC mass within its design capacity. Continued operation of the SVE treatment system, either in continuous or pulsed mode, would not be effective. As such, the U.S. EPA and MDEQ approved SVE system shut down on January 20, 2006, with follow-up soil verification sampling. There remained areas with elevated concentration of VOCs, but they were not being effectively removed by the SVE system. This information prompted the Hot Spot investigation in late 2006. The cleanup objectives of the ROD are to residential levels. Additional cleanup is likely, however, cleanup to modified and updated cleanup criteria is more realistic.

## **IV. Five-Year Review Process**

### **Administrative Components**

The Rose Township Third Five-Year Review team included Nabil Fayoumi, U.S. EPA's Remedial Project Manager (RPM) for the site and Mary Schafer and Chuck Graff of the MDEQ. U.S. EPA notified the MDEQ and the PRP's Project Manager (Rick Miesczak, Daimler Chrysler), site community involvement coordinator, Region 5 Five-Year Review Coordinator, in a letter, dated December 19, 2006, that the Five Year Review process had begun. A public notice was placed in the February 25, 2007 edition of the County Times. The site information repository is located at the Holly Public Library. The MDEQ and the Region 5 Five-Year Review Coordinator were provided a draft of this Five-Year Review in April 2007. Their comments have been incorporated into this report.

The review consisted of the following components:

Community Involvement;  
Document Review;  
Data Review;  
Site Inspection; and,  
Five-Year Review Report Development and Review

### **Community Involvement**

The Comprehensive Five-Year Review Guidance states that the community should be notified when a Five-Year Review is being conducted. In accordance with the Guidance, a notice was sent to the local newspaper on February 25, 2007. A copy of the public notice is located in Appendix II. The public

notice described the Rose Dump Site, stated that a Five-Year Review of the cleanup was being conducted by U.S. EPA, and that the public could participate in the process. No comments were received in response to the public notice. U.S. EPA will provide the public with a notice of completion of this Five-Year Review. In addition, a copy of the completed Five-Year Review report will be provided to the local site repository.

## **Document Review**

This Five-Year Review considered relevant documents including: the site ROD, the Second Five-Year Review, O&M Plan, groundwater monitoring data, Hot Spot Investigation Report, Draft Institutional Control Investigation Study dated March 2007, and Capture Zone Analysis Memorandum dated March 30, 2007. Applicable groundwater cleanup standards, as listed in the ROD were also reviewed.

## **Data Review**

Groundwater monitoring has been conducted at the site since 1995, in compliance with the April 1995, Groundwater Monitoring Plan. The Groundwater Monitoring Plan was subsequently revised in March 2002 based upon the evaluation of historical data and the related issues discussed below. The November 3, 2000, *Results of 5-Year Monitoring Event Report*, the last comprehensive groundwater monitoring result report, was reviewed as part of the 2002 Five-Year Review. That report included the most recent results from the site groundwater monitoring wells along with purge well influent and effluent monitoring results, and groundwater elevation data. In addition to the parameters analyzed in the annual monitoring events (the specific target compounds) at several wells, the five year event included analyses for the complete target compounds list of organic parameters to determine if any other parameters should be included in future rounds of monitoring or if any other modifications to the program are necessary.

An analysis of the annual groundwater monitoring results showed that north of GW9S, vinyl chloride is the primary contaminant detected in the monitoring and purge wells. However, in the southern half of the plume BTEX, compounds, along with chloroethane, and trichloroethane are detected in several of the near source wells. This may indicate that natural attenuative processes are mitigating some of the contaminants as they move downgradient with vinyl chloride as the remaining end product of these processes. However, not enough data has been collected to determine what processes, if any, are responsible for this apparent trend. Those parameters have been included in the revised groundwater monitoring plan. This analysis also illustrated a lack of complete plume capture and that more work was necessary to properly evaluate hydraulic and chemical capture.

In January 2002, the Rose Township PRPs installed three new monitoring wells (GW 17I, GW 17D, and GW 18) north-northeast of PW-6. The wells were installed by the PRPs to address concerns raised by MDEQ that insufficient evidence was available to demonstrate that the extraction wells were completely capturing the plume. Because of the difficulties associated with installing wells in the wetlands just east of PW-6, and the artesian conditions present there, the demonstration of contaminated groundwater capture had been based upon interpretations of groundwater elevation, groundwater modeling, and groundwater volume calculations.

In 2002, groundwater volume calculations used estimates of average hydrogeological data on aquifer thickness, water quality data, and water level measurements to compare the volume of water moving through the impacted portion of the aquifer to the volume of water being extracted. Based upon the site data, it was estimated that approximately 130 gallons per minute of groundwater is flowing through the

area. The extraction system, when fully operational, pumps at approximately 400 gallons per minute. However, over the last several years there have been extended periods of time when one or more of the extraction wells have been off-line.

The modeling in the late 1990's seemed to indicate that complete capture of the plume was occurring. In 1999, pumping rates at extraction well PW-6 were doubled to about 100 gpm, and vinyl chloride influent concentration increased six-fold (extraction rates at other wells remained relatively stable) to approximately 60 ppb. Other pieces of data raised questions concerning the completeness of capture and/or the efficiency of the system. First vertical aquifer sampling (VAS) performed during the installation of the GW 17 series wells, in January 2002, found 60 parts per billion vinyl chloride in a zone 110 to 115 feet below the ground surface. The GW 17 wells are located outside and downgradient of the PW-6 and PW-4 capture zone at the toe of the plume. Sample results from the permanent wells installed at those locations have since confirmed the VAS sample results. These two facts demonstrated that complete capture is not occurring.

Several site investigations and well installation programs have been implemented since the last Five-Year Review to gain a better understanding of the chemical and hydraulic characteristics, both on-site and off-site, and to evaluate dissolved plume migration patterns to the northeast. A total of nineteen new groundwater monitoring wells have been installed, and groundwater monitoring has continued on a routine basis. Thirty-five groundwater monitoring wells are sampled quarterly and fifty-seven monitoring wells are sampled annually for VOCs, natural attenuation parameters (ammonia, nitrate/nitrite, sulfate, chloride, total organic carbon, alkalinity, and dissolved gases methane, and ethane). Additionally, in an effort to evaluate impact to off-site residential wells, the PRP group assumed the residential sampling program whereby eighteen off-site residential wells are monitored monthly or semi-annually for VOCs. More than 1,500 groundwater samples have been collected as part of the site groundwater monitoring efforts since the last Five-Year Review.

Investigative work has been conducted to evaluate hydrologic and hydrogeologic conditions on-site and off-site to the northeast. To this end, geochemical sampling and slug testing work was conducted, new monitoring wells were gauged, and a hydrologic study was conducted, in an effort to determine deep and shallow groundwater flow patterns near the northeast property boundary and off-site to the northeast.

A general chronology of remedial and investigation site activities since the last Five-Year Review is summarized as follows:

- July 2002 through December 2003 – Continued routine groundwater monitoring and environmental evaluation for remedial strategies and new well placements.
- January 2004 – Installed on-site monitoring wells GW-19S, GW-19D, GW-20I, and GW-20D.
- May 2004 – PRP group assumed responsibility for the Residential Well Sampling Program.
- August 2004 – Installed off-site monitoring wells GW-22I, GW-22S, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, and GW-24D.
- September 2004 – Installed on-site monitoring wells GW-21S, and GW-21D.
- January 2005 – Conducted off-site Geochemical Groundwater Evaluation, but several key wells were frozen and not available for sampling.

- November 2005 – Conducted Hydrologic Study.
- March 2006 – Installed off-site monitoring wells GW-25S, GW-25D, GW-26S, GW-26D and conducted Supplemental Hydrologic Study.
- October 2006 – Optimize Pump and Treatment System.

In 2007, the U.S. EPA's GEOS Team performed statistical analysis on the groundwater chemistry data and evaluated the remedy capture zone and the remedy pumping rates. GEOS's findings, recommendations, and conclusions are included in Appendix III.

## **Site Inspection**

A site inspection was conducted on March 22, 2007. In attendance were Nabil Fayoumi, U.S. EPA; Mary Schafer, MDEQ; Chuck Graff, MDEQ; Rick Mieszczak, DaimlerChrysler; Rita Brenner, Earth Tech, and Vipul Mehra, Earth Tech. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of fencing to restrict access, the integrity of the cap, the condition of the existing pumping and treatment system, the condition of the monitoring wells, and the effectiveness of land use restrictions.

A pre-inspection meeting was held at the site prior to the inspection. RPM Nabil Fayoumi gave an overview of the U.S. EPA's Five Year Review Program. U.S. EPA, MDEQ, PRP, and Earth Tech conducted a health and safety meeting. Some generalized discussions were also held about site zoning and the Institutional Control Investigation Study.

Earth Tech provided U.S. EPA and MDEQ with an overview of the groundwater treatment system, the treatment system control room, and the soil vapor extraction treatment system. U.S. EPA reviewed the site notes and the treatment equipment.

No significant issues have been identified regarding the soil cover. Some fallen trees and fencing damage was evident. Fence inspections do occur routinely. A fencing contractor was recently at the site to make repairs to several other areas of the fence. Trees frequently fall naturally and damage the fence, and in other instances the fence is cut by vandals. Efforts are made to repair the fence, remove the falling trees and keep the site secure. The site in general was in good condition and undisturbed. Inspection of the site was limited due to heavy rains.

## **Interviews**

There has been low community interest in this site. This low community interest in the site is supported by the fact that neither the RPM nor the CIC has been contacted by the community during the Five Year Review process. In addition, no community members responded to the Five-Year Review public notice that invited readers to contact the CIC or the RPM for more information on the Five-Year Review process. Therefore, no interviews were conducted with parties connected with the site.

## **V. Progress Since Last Five-Year Review**

This is the third Five-Year Review for the site. The 1997 and 2002 Five-Year Reviews recommended that the PRP group continue operation as designed until final soil and groundwater cleanup standards, as

set forth in the ROD and CD, are achieved. Since the last Five-Year Review, the PRP group has continued to operate the system as required by the ROD and CD. The Data Review Section shows progress made at the site. Several studies and well installations have been implemented. The complex subsurface hydrology had made plume capture difficult. Complete capture of the site plume has not been achieved and two residential wells have been impacted to date.

The last Five-Year Review recommended that ICs be developed and implemented. U.S. EPA is currently working with the PRPs to ensure that an IC Plan is developed and implemented within the next year.

## **VI. Technical Assessments**

### ***Question A: Is the remedy functioning as intended by the decision documents?***

No. The groundwater extraction system is functioning in the operational definition of the term, but not performing as intended by the ROD and ROD Amendments. The groundwater extraction system is not effectively capturing the entire plume. Modification to the extraction system and/or monitoring network is necessary to ensure complete capture of the plume. Furthermore, in 2005 and 2007, vinyl chloride was detected at two residential wells. One residential well exhibited elevated vinyl chloride concentration that exceeded the Part 201 Drinking Water Criteria of 2.0 ug/l for vinyl chloride.

The incineration of the PCB contaminated soils, and the on-site treatment and disposal of the arsenic and lead contaminated soils has achieved the remedial objectives to minimize the migration of contaminants to groundwater and surface water and prevent direct contact with, or ingestion of, contamination in soil and sediments. ROD objectives were to meet the residential clean-up levels for soils. Any areas not meeting residential clean-up criteria will require a deed restriction.

Operation and maintenance of the SVE system has been mostly effective. Monitoring of the influent concentrations to the system has demonstrated a dramatic decrease in the concentrations for the contaminants of concern. This has greatly reduced the risks posed by potential migration of contaminants to the groundwater and potential direct contact to the contaminated soils. The Hot Spot Investigation detected soil contamination that is contributing to the groundwater contamination and needs to be addressed

The SVE system continued to treat approximately 123,000 cubic yards of soils using 91 SVE wells. A four-week SVE spike test was conducted in October 2005. At that time, the SVE system had removed and treated over 6,800 pounds of VOCs, before achieving asymptotic levels for several years. VOCs yields since December 2001 had stabilized to insignificant levels (approximately 0.00 to 0.08 pounds per day). The spike test demonstrated that the SVE system had effectively removed the VOC mass within its design capacity. U.S. EPA has determined that continued operation of the SVE system, either in a continuous or pulsed mode, would not be effective. Based on the results of the spike test, U.S. EPA and MDEQ approved the SVE system be shut down on January 20, 2006. Shutting down the SVE system did not affect the protectiveness of the remedy.

### ***Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?***

No. Standards for two contaminants have been lowered since the ROD was issued; the arsenic MCL has been lowered from 50 ppb to 10 ppb, and the Part 201 standard for ethylbenzene has been lowered from

680 ppb down to 74 ppb. The MCL for ethylbenzene remains at 700 ppb. The current MCL of 10 ppb for arsenic has been achieved with the highest concentration detected anywhere on site being 10 ppb. While the Part 201 standard for ethylbenzene has been lowered from 680 ppb down to 74 ppb, the MCL for ethylbenzene remains at 700 ppb. With the exception of RW-5S, ethylbenzene is not typically detected in the groundwater monitoring wells at the site. Concentrations at RW-5S range from 1.2 ppb to 11 ppb. The current ROD's Target Concentration Limits (TCLs) for ethylbenzene is consistent with the 1987 ROD and 1989 CD. Modification of the Part 201 Standard for ethylbenzene occurred after the CD was enacted.

As the remedial work has been completed, some of the ARARs for soil contamination cited in the ROD and ROD Amendment #2 have been met. Specifically, the standards for PCBs, arsenic and lead have been achieved through excavation, incineration of PCBs contaminated soils, and on-site consolidation, treatment, and capping of the resulting ash, lead and arsenic contaminated soils. However, to-date there has not been a demonstration by the PRPs that the subsurface VOC subsurface standards have been achieved. This will be completed through time. Any areas not meeting residential cleanup criteria will require a deed restriction.

*Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

Yes. The assessment of this Five-Year Review found that long-term protectiveness determination of the remedy cannot be made at this time until further information is obtained. Further information will be obtained by completing the capture zone evaluation for recently increased extraction pumping rates at the eastern-most edge of the VOC plume. Additional analytical data is needed to provide evidence that the entire VOC plume is being captured at the new extraction rates. Also additional monitoring wells may be installed to better evaluate hydraulic capture of the VOC plume and to determine if another extraction well is necessary to achieve plume capture. Additional hot spots sampling and treatment are being considered to eliminate the source for groundwater contamination. Continued monitoring of downgradient wells GW-18 and GW-17I/D is necessary while evaluating vinyl chloride concentration trends in wells situated at the property boundary (GW-19S and GW-20D). It is expected that these actions will take 12 months to complete, at which time a long-term protectiveness determination will be made.

Vinyl chloride has been consistently detected at a residential well since it was first sampled by Oakland County Health Department (OCHD) in June 2003. In February 2005, the vinyl chloride concentration increased to 2.3 ug/l, and increased to 4.8 ug/l in February 2007, which exceeded the Part 201 Drinking Water Criteria of 2.0 ug/l for vinyl chloride. In April 2005, a groundwater temporary treatment system was installed in the basement of the resident. This treatment system has been successful at treating the vinyl chloride concentration to non-detectable levels. The treatment system is protective and effective for the short-term. Other long term solutions are being considered. Recently, vinyl chloride was detected in another residential well at concentration below U.S. EPA's action levels.

Additionally, evaluation of the ICs has not been completed but initial IC evaluation activities have revealed additional steps must be taken to ensure that effective ICs are developed, implemented, maintained and monitored. The site remedy as specified in the CD anticipates unlimited use and unrestricted exposure when the remedy is complete and meets the clean-up criteria. Consequently, unlimited use and unrestricted exposure is not possible at areas where the ROD clean-up requirements are not met such as the capped area, the on-site consolidated soil stockpile, exceeding ROD cleanup criteria, and the area of the groundwater exceeding ROD or MCL cleanup criteria.

The ROD identified aquatic and terrestrial organisms as being potentially at risk of exposure to site related contaminants, lead, arsenic, chromium and zinc. Through the implementation of the remedy, including consolidation of the contaminated soils beneath a five foot layer of clean soil, those exposure routes have been effectively mitigated. No weather-related events have affected the protectiveness of the remedy. No other information has come to light that could call into question the protectiveness of the remedy.

### **Technical Assessment Summary**

According to the data reviewed and the site inspection, the remedy is not operating as intended by the ROD and CD. Additional analytical data is required to verify that recent and near future modifications to the treatment system attain groundwater plume capture. The optimization of the groundwater extraction system started October 2006. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes in exposure pathways or toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

## VII. Issues

**Table 2 – Issues**

Issue Number	Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1a	Groundwater chemical and hydraulic data suggests that the plume has not been completely captured and that capture zone needs enhancement.	N	Y
1b	Some additional soil contamination has been identified.	N	N
1c	Vinyl chloride continues to affect two residential drinking water wells.	N	Y
2a	Work with the PRPs on ICs.	N	Y
2b	Establish ICs based on current and reasonably anticipated future land use.	N	Y
2c	Revise the existing groundwater monitoring plan to ensure that the future ICs are maintained and complied with in the short and long term.	N	Y
2d	Fallen trees and damaged fence.	N	N

## VIII. Recommendations and Follow-Up Actions

**Table 3 – Recommendations and Follow-Up Actions**

Issue Number	Issues	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
						Current	Future
1a	PRPs demonstrating plume capture	Collect additional hydraulic and chemical data to verify the extent of plume capture and ascertain the best location for placement of an additional extraction well.	PRPs	U.S. EPA	07/2008	N	Y
1b	Hot spots excavation/treatment	Excavation and/or treatment of soil contamination hot spots will eliminate the continuing source of contaminants to the groundwater.	PRPs	U.S. EPA	07/2008	N	N
1c	Vinyl chloride in two residential wells.	Continue to provide treatment to the residential well until the capture is optimized and vinyl chloride no longer shows up in that well. Place a restriction on the use of the shallow groundwater in the interim. Possibly replace existing well with a deeper one.	PRPs	U.S. EPA	07/2008	N	Y
2a	The recommended ICs have not been implemented. Also, the need for additional ICs needs to be explored.	Prepare an IC Plan to conduct additional IC evaluation activities including surveying, title	U.S. EPA (with input from PRPs)	U.S. EPA	01/2008	N	Y

	Implementing and maintaining effective ICs will be required to assure protectiveness of the remedy.	work and re-evaluating the need for additional ICs and planning for the implementation of the ICs.					
2b	Establish a future use for the site and revise ICs.	With consultation with PRPs, U.S. EPA will consider future land use and whether additional ICs are required.	U.S. EPA (with consultation of PRPs)	U.S. EPA	12/2008	N	Y
2c	Long-term stewardship must be assured which includes maintaining and monitoring effective ICs.	Develop a plan to oversee and monitor ICs to ensure long term stewardship to ensure existing and future ICs are maintained and complied with in the short and long term. The Plan requires annual analysis and reporting and certification of conformance to the ICs and their effectiveness.	PRPs	U.S. EPA	After the IC Plan is completed.	N	Y
2d	Fallen trees and damaged fence.	Remove fallen trees and repair damaged fence.	PRPs	EPS	9/2007	N	N

## **IX. Protectiveness Statement**

A protectiveness determination of the remedy at the Rose Township Superfund site cannot be made at this time until further information is obtained. Further information will be obtained by completing the capture zone evaluation for recently increased extraction pumping rates at the eastern-most edge of the VOC plume. Additional analytical data is needed to provide conclusive evidence that the entire VOC plume is being captured at the new extraction rates. Also additional monitoring wells might be installed to better evaluate hydraulic capture of the VOC plume and to determine if another extraction well is necessary to achieve complete plume capture. Additional hot spots sampling and treatment are being considered to eliminate the source for groundwater contamination. Continued monitoring downgradient wells GW-18 and GW-17I/D must occur, while evaluating vinyl chloride concentration trends in wells situated at the property boundary (GW-19S and GW-20D). It is expected that these actions will take 12 months to complete, at which time a long-term protectiveness determination will be made

## **XI. Next Review**

The next Five-Year Review for the Rose Township Dump Site is required five years from the signature date of this five-year review.

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Appendix I & II (Figure 1 - Site map & well locations; Figure 2 – Groundwater Level Elevation Contours)



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